

Project Narrative Memorandum

Date: 20 November 2017

Subject: Renton Apron R Infrastructure Maintenance and Repair
–Shoreline Project Narrative - UPDATED

From: Dan Roscoe, Senior Environmental Scientist

To: Mark Clement, Boeing Permit Specialist

Route To: File

The following project narrative has been prepared for the proposed Apron R Infrastructure Maintenance and Repair project (project). The purpose of this narrative is to provide sufficient project details to inform the City of Renton's (City) review of the proposed project with respect to review under the City's Shoreline Management Plan.

1.0 INTRODUCTION

Boeing is proposing to complete the project to address issues with Apron R and maintain its current operations. A pre-application meeting with the City was held 8 June 2017 to discuss permitting requirements for the Apron R project. The meeting identified the following land use permits and approvals required for the project.

- State Environmental Policy Act (SEPA) review
- City Shoreline Management Act review, Substantial Development and Conditional Use Permits
- City Critical Area Review included under the Shoreline review
- U.S. Army Corps of Engineers (USACE) Section 10/404 permit
- Washington Department of Ecology (Ecology) Section 401 Water Quality Certification
- Ecology Construction Stormwater Permit
- Washington Department of Fish and Wildlife Hydraulic Project Approval

The subject property (Parcel ID 0723059001) is currently zoned Commercial Mixed Use (CMU) under the City Zoning Code. Boeing operates its facilities under a Development Agreement for Renton Plant Redevelopment approved by the City in 2003. Adjacent lands are also zoned CMU. The shoreline designation is High Intensity.

The project is located within previous developed areas of the entire Boeing Company Renton plant. There are no off-site improvements associated with the Apron R project. Underlying soils are mapped as Urban Land and known to contain high groundwater due to the proximity of the lake. Drainage on the site includes runoff from existing impervious areas and buildings. The historic construction and operation of the project area has resulted in portions of the site receiving stormwater treatment and portions that runoff directly to the lake with no treatment.

The project area is accessed via a Boeing Security Gate. Driving directions from Interstate 405 (I-405) are as follows.

- Exit I-405 Northbound at Exit 2.
- Take Exit 2 toward Renton/Rainier Avenue.
- Continue on Rainier Avenue South northbound for approximately 1 mile.
- Turn Right onto Airport Way South.
- Turn Left onto Logan Avenue North.
- Turn left on North Eighth Street.
- Turn right into Boeing Visitor Parking Lot (gate access required onto Boeing property).

2.0 PROJECT SUMMARY

The proposed project will include the repair and/or replacement of existing structures within the vicinity of Lake Washington, including within the 200-foot shoreline management zone. The proposed activities include excavation and fill, concrete paving, utility trenching, and stormwater work. The fair market value of the construction is estimated at \$29,249,100.

3.0 EXISTING LAND USE

The Boeing Company Renton plant is located at the southernmost end of Lake Washington between Rainier Avenue North and I-405. The plant comprises multiple buildings, utilities, and support facilities used in the production of 737 airplanes.

Apron R is located on the south shore of Lake Washington, north of Buildings 4-41, 4-20, 4-81, 4-82, and 4-83. Most of Apron R was constructed in the early 1940s and is approximately 14 acres. Apron R's primary function is to transport completed airplanes from the assembly line to Renton Field. Current production rates result in 42 airplane deliveries per month, meaning roughly two airplanes are moved to Renton Field per day. Airplane movement typically occurs at night but is dependent on production scheduling. Airplanes are staged on Apron R in designated stalls to undergo systems checks, to make minor modifications, and/or to temporarily store the airplanes before they are transported to Renton Airport.

Lake Washington is located immediately adjacent and north of Apron R. Portions of the apron are constructed on pile-supported structures that extend over the lake. The Washington State Department of Natural Resources (DNR) maintains a mitigation site (completed for the Washington State Department of Transportation State Route 520 Floating Bridge project) adjacent to Apron R that has restored natural shoreline habitat and functions to a portion of the lakefront. Additional information on aquatic habitat conditions within the project area can be found in the Lake Study Narrative and Habitat Data Report, included as a separate document.

4.0 TECHNICAL PROJECT DESCRIPTION

The project area has been divided into three areas, described in detail below, to refer to specific portions of the apron (**Figure 1**).

- Area 1 – West Apron Improvements
- Area 2 – East Apron Improvements
- Area 3 – Central Apron Improvements

The areas have been developed in part to comply with the requirement to maintain an active airplane delivery route to Renton Field at all times. One challenge of this project is that Boeing only allows a 10-day shutdown of production during the winter holidays (typically 24 December through 3 January). The scope of the key elements along the airplane tow path is large, and construction cannot be accomplished during the holiday closure, nor do they necessarily match allowed in-water work windows. Phasing the project will be a key component that Boeing and the design team will address during the design phase in order to allow Boeing to manage construction and production schedules throughout. The areas identified above and described below are not specific to the order in which the project will be constructed.



Figure 1. Apron R Area Layout

4.1 Area 1 – West Apron Improvements

Area 1 is defined as the frontage for Building 4-20 and the connection to Renton Field. It includes approximately 6.3 acres of pavement that will be replaced (**Figure 2**). The main components of Area 1 include the replacement of pile-supported structures with slab on grade, replace the existing bulkhead, improve stormwater treatment, maintain an airplane delivery route, and enhance aquatic habitat and shoreline function in Lake Washington. Additionally, Boeing will replace security fencing between its facility and the Renton Airport to prevent trespassing on both its property and the airport.

There are several sections of pavement that are supported by timber piling over the water. These structures are showing significant signs of deterioration and need to be removed or replaced. The existing bulkhead on the lake is being undermined, resulting in pavement failure behind the bulkhead. Finally, as a result of pavement settlement, stormwater runoff ponds in several areas and requires management.

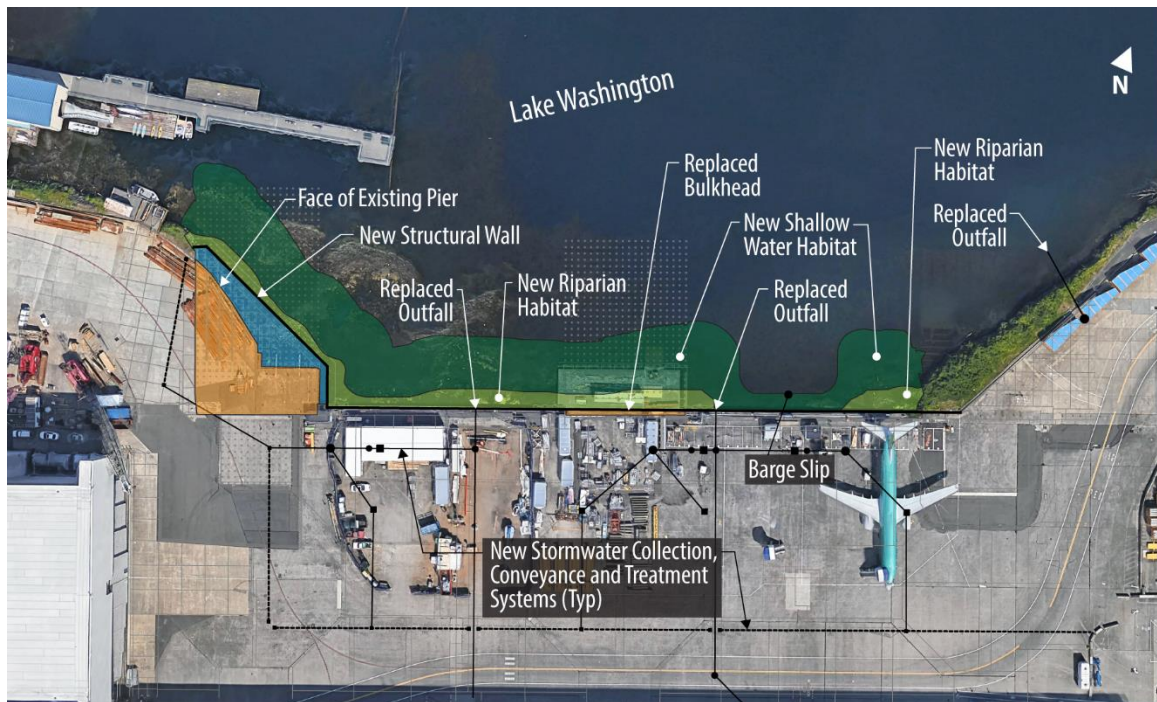


Figure 2. Area 1 Layout

4.1.1 Pile-Supported Structure Replacement

The west apron contains four pile-supported structures: the pile-supported apron, the west ramp, the central ramp, and the bulkhead. The proposed Apron R project would remove and replace the pile-supported apron and west ramp with slab on grade, remove the central ramp deck, and replace the bulkhead.

The combined pile-supported apron and west ramp is an approximate 11,200-square-foot pile-supported structure that extends overwater (**Figure 2**). Overwater coverage of this combined structure is approximately 7,600 square feet. This structure was inspected in 2015 and was determined to consist of untreated wood piling and concrete pile caps. This structure is located along the airplane tow path and is a critical section of pavement as airplanes move around Building 4-41 at the narrowest part of the apron. The tow path will need to be temporarily shifted to remove and replace this structure. The proposed project would construct a temporary containment wall in Lake Washington, completely remove the pile-supported structure, construct a new structural wall, place structural backfill behind the wall, and repave the surface with dowelled cement concrete pavement of uniform thickness.

The temporary wall is anticipated to be constructed during the summer and winter in-water work windows, which will isolate the existing overwater structure from Lake Washington. Existing piles within 6 feet of the proposed wall would be removed, as

necessary, prior to installation of the temporary wall in the summer in-water work window. Sheet pile will be driven with vibratory hammers. Once the wall is constructed, the area behind the wall will be dewatered and construction activities to remove the overwater structure would then occur outside of the in-water work windows. Once the new structural wall is complete, the temporary wall will be cut off at 17.1 feet elevation NAVD88 to prevent future undermining. The buried portion of the wall will be covered by the proposed aquatic habitat enhancement area.

After dewatering the work area, portions of the existing pile-supported structure will be removed and temporary shoring will be installed as necessary to support the remaining structure. Structural backfill will then be placed in lifts supported by a geogrid, or similar reinforcing material, to minimize future differential settlement. A temporary surface (e.g., asphalt) would be constructed to support shifting the tow path to the temporary bypass route alignment. After the tow path is shifted, the remaining pile-supported structure would be demolished and removed. This area would then be filled with structural backfill and compacted to design requirements before the finish concrete pavement surface is constructed (**Figure 2**). The tow path would then shift back to its original alignment and the temporary surface would be removed. The final concrete pavement would be constructed over the remaining area.

Construction of the new 192-foot structural wall would occur in Lake Washington and reclaim approximately 10,895 square feet of the lake, including the conversion of the existing 7,600 square feet of existing overwater structure coverage to fill. The structural wall comprises mechanically stabilized earth (MSE) wraps, structural backfill, and a concrete stem wall. Approximately 3,317 square feet of new area would be added to the apron after the structural wall is completed. The new structural wall placement has been designed to create a temporary airplane bypass route that would be used to reroute airplanes, while the remaining portion of the tow path section is rebuilt, and maintain airplane production with minimal disruption. The proposed structural wall placement accounts for the distance between the airplane landing gear (23 feet), plus 5 feet outside of each wheel to allow for safe maneuvering. This configuration represents the minimum footprint needed to provide a bypass route.

The center and west ramps are no longer used by Boeing for airplane or boat production. The project would demolish the center ramp deck (7,800 square feet) and remove approximately 3,220 square feet of overwater coverage and convert to nearshore habitat (**Figure 3**). The west ramp will be demolished and replaced by the new structural wall and associated fill as described above.



Figure 3. Overwater Structure Removal

4.1.2 Bulkhead Replacement

During the 2015 condition assessment, undermining was observed at the existing bulkhead at the north end of the apron in front of Building 4-20. The existing bulkhead consists of an inner (landward) and outer (waterward) concrete wall founded on pile-supported pedestals. An 8-foot-wide structural slab connects the two walls. The bulkhead was not observed to be affected by the loss of material. However, pavement sections behind the inner bulkhead wall have been undermined resulting in differential settlement and pavement cracking. The proposed project will replace approximately 500 linear feet of bulkhead to support the replaced pavement and prevent undermining in the future.

The new bulkhead will be constructed within the same general footprint as the existing bulkhead, and the final apron limits will not extend the footprint of the structure into the lake. During construction, a temporary sheet pile wall will be constructed immediately in front of the existing bulkhead. Sheet pile will be installed with vibratory methods and will tie into the existing structure to close off the ends to create a work area. The wall is not anticipated to be watertight; therefore, wet construction methods will be used behind the wall.

The existing bulkhead will be demolished behind the temporary sheet pile wall outside of the in-water work window. Two types of bulkhead will be constructed, one for general use and one for barge operations. The general use bulkhead, approximately 360 linear feet, will be constructed out of a concrete stem wall supported by compacted structural fill. After removal of the existing bulkhead, the surface will be prepared with a crushed rock base course. A spread footing would be constructed to support the concrete bulkhead. Once the footing is in place, vertical concrete walls would be constructed to the design bulkhead height. The barge bulkhead, approximately 140 feet, will be constructed out of steel sheet pile.

After the bulkhead is replaced, the temporary sheet pile wall would be cut off at 17.1 feet elevation. The remaining sheet pile is intended to prevent future undermining by groundwater movement. The sheets would also be covered by the aquatic habitat enhancement material and would not be visible.

4.1.3 Aquatic Habitat Enhancement

The current lake shoreline is highly degraded from past development. The vertical bulkhead provides minimal shoreline function and is not consistent with current regulatory programs. Replacing the bulkhead does not change this condition. Similarly, the proposed structural wall would extend the length of vertical shoreline in the lake. An aquatic habitat enhancement program has been proposed to enhance shoreline function along the replaced bulkhead and proposed structural wall.

The proposed aquatic habitat enhancement comprises three elements; (1) multiple fill materials to prevent undermining and enhance benthic habitat, (2) multi-sloped benthic environment to improve functions, and (3) riparian plantings to improve functions as described in detail below (**Figure 4**). Approximately 36,000 square feet of lakebed would be impacted by the habitat enhancement area. All fill proposed waterward of the new structural wall is for habitat enhancement only and is not required for any structural purpose.

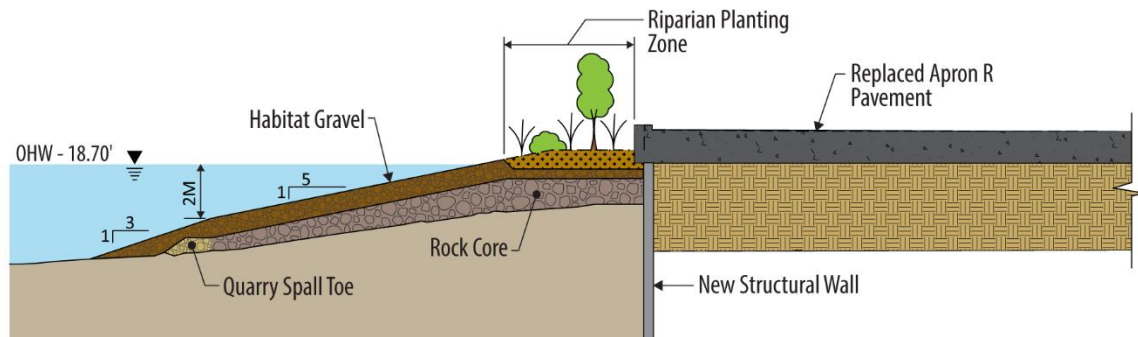


Figure 4. Typical Cross Section of Habitat Enhancement Fill

MEMO: Renton Apron R Infrastructure Maintenance and Repair
Technical Project Description - Revised
UPDATED 20 November 2017
Page 9

Multiple Fill Materials

The initial placement of material on the lakebed will include light loose riprap (18-inch minus) below the ordinary high water mark (OHWM) of Lake Washington (**Figure 4**). Riprap will be placed on the lakebed in lifts and compacted with mechanical methods. Riprap will extend waterward from the bulkhead on the substrate and sloped back to the apron. The riprap course will be built up to support multiple slopes aimed at improving benthic habitat and reducing wind/wave erosion on the proposed shoreline. The final layer of materials will be a 2-foot-thick habitat mix top dressing designed to provide a fish-friendly surface for juvenile salmonids.

Multi-Sloped Benthic Environment

The proposed enhancement includes two design slopes. First, the project will implement a 5H:1V slope within the shallow water habitat (SWH) zone. SWH is primarily used by rearing juvenile salmonids and is defined as water depth up to 2 meters. The slope has been selected to retain finer grain size material preferred by juvenile salmonids and to reduce the effects of wind/wave erosion on the constructed shoreline.

Waterward of the SHW zone, the project will use a 3H:1V slope to tie in the proposed fill to the lake bottom. This slope has been selected to minimize the overall fill footprint while maintaining long-term slope stability.

Riparian Planting

The enhancement plan will create a sinuous lake shoreline that averages 10 feet in width, as measured waterward from the edge of the apron. The proposed shoreline would be extended approximately 1 foot above the OHWM to create a suitable planting area for native riparian species. The overall goal of the riparian plantings is to increase shoreline functions by providing riparian shade during the day, blocking artificial light sources at night, and increasing organic matter input to the lake.

4.1.4 Barge Operations

Boeing currently receives barge deliveries on Apron R for both materials and equipment. Deliveries occur on an infrequent basis according to production schedules. The proposed project will maintain existing barge access and formalize a location on the apron where barges will load/unload and pavement areas will be designated for heavy lifts (**Figure 5**).

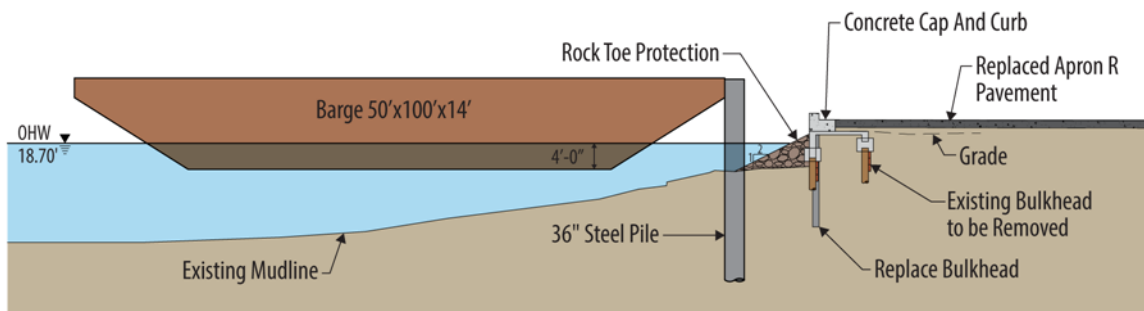


Figure 5. Proposed Barge Concept

The aquatic habitat enhancement design accounts for the barge location. The requirements for barge access are to provide a slip area 80 feet wide along the face of the replaced bulkhead and a draft of 4 feet. In this location, the replaced bulkhead will be sheet pile, with a rock toe protection to prevent scour and undermining. The actual barge width is closer to 50 feet; however, a 15-foot offset on each side has been allowed for maneuvering. Additionally, cranes must be able to reach the barge for load/unloading. The project includes the installation of two fender pipe piles for the barge to nose against. Within the 80-foot slip, there will be no riparian planting zone as it could interfere with load/unload operations. Bulkhead toe protection will be limited to the amount necessary to prevent undermining and allow sufficient water depth for the barge.

4.1.5 Utilities

The proposed project will replace existing utilities within the apron footprint, including electrical, compressed air, chilled water, fire water, and communications. These utilities are supplied to airplane work areas, referred to as hardstands. Existing surface-mounted utilities currently used to feed hardstands would be moved underground as part of the project. Connections would be made at each hardstand by stubbing lines to the surface. There would be no increase in the capacity of the utility systems or an increase in the number of hardstands current located on the shoreline.

4.1.6 North Bridge Drainage

An area of ponding on the east side of the North Bridge presents an operational concern. Boeing will correct the localized drainage to prevent future ponding. Corrective measure include replacement of concrete panels to direct surface runoff to the nearest catch basin.

4.2 Area 2 – East Apron Improvements

Area 2 is defined as the frontage for Buildings 4-81, 4-82, and 4-83. It includes approximately 3.2 acres of pavement that would be replaced (**Figure 7**). There are several other elements of Area 2 that would be improved with this project, including the

installation of a new stem wall to raise the overall apron elevation and the relocation of a stormwater outfall into the lake.

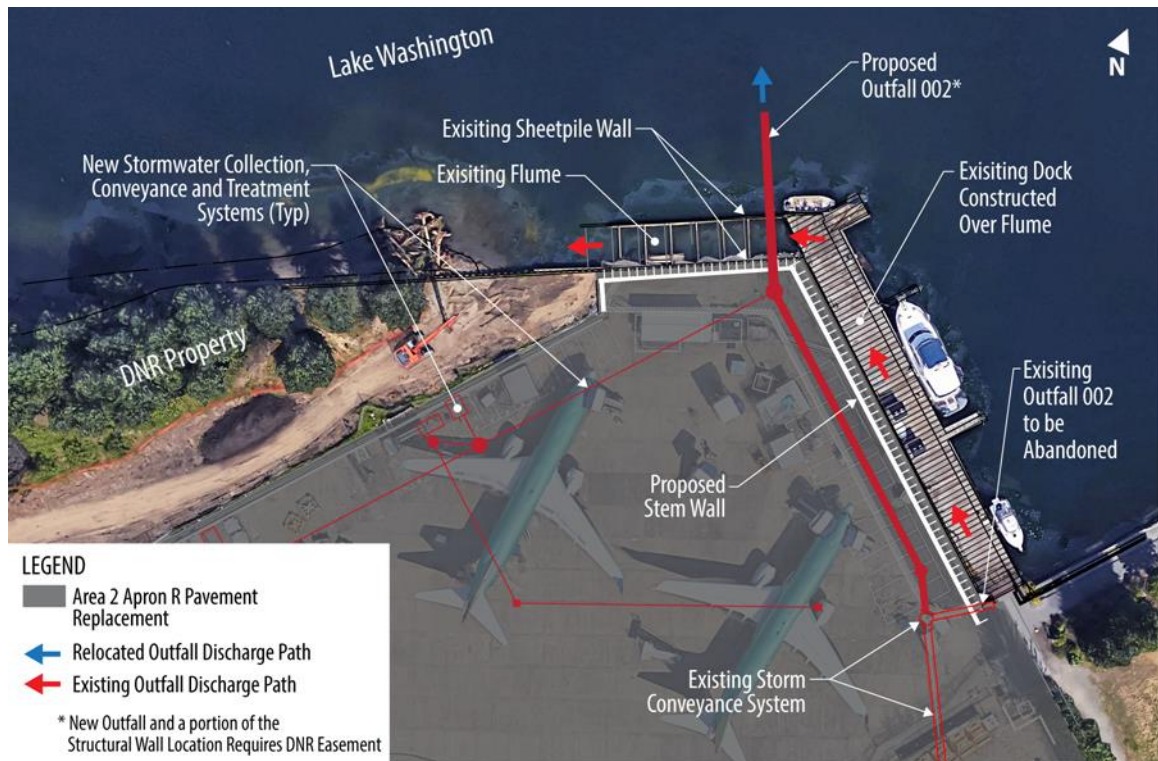


Figure 6. Area 2 Layout

4.2.1 Northeast Corner Stem Wall

The existing sheet pile bulkhead wraps the northeast corner of the apron shoreline for approximately 290 feet and retains about 12 feet of fill. This wall serves as the inner wall of the old cooling water flume from the decommissioned Puget Sound Power steam plant. The outer wall of the flume is connected to the inner wall by welded steel beams. A private dock has been constructed by Southport LLC on the northeast side of the Boeing property. The existing inner sheet pile bulkhead supports Apron R and was found to be in fair condition (Figure 6).

The proposed project will construct a new stem wall on top of the existing apron approximately 10 feet landward of the existing inner sheet pile wall to reduce lateral loads on the flume sheet pile from the raised grades in Area 2. The existing sheet pile will be left in place, as it is integral to the flume and dock structures. A cathodic protection system will be added to reduce future maintenance needs for the flume. The new stem wall, approximately 258 linear feet, is envisioned to be a 2- to 4-foot high cast-in-place concrete wall supported by a footing (Figure 6). Tiebacks for the existing sheet

pile wall would be left in place. Construction of the new stem wall would occur from uplands behind the existing sheet pile. No over- or in-water work is anticipated in the construction of this wall. Temporary excavation would occur on the apron to construct the footing for the new stem wall. The 10-foot-wide setback area from the flume would be graded to drain away from the stem wall and paved to allow for routine inspections and maintenance.

In-water work elements in Area 2 include the installation of cathodic protection systems in the flume, and construction of Outfall 002 (see Section 4.5). The cathodic protection system will consist of anode sleds placed on the benthic surface in between the inner and outer flumes walls. In-water work will also be needed to install Outfall 002 through the inner and outer flume walls and is expected to be limited to cutting and welding activities.

4.2.2 Utilities

The proposed project will replace existing utilities within the apron footprint, including electrical, compressed air, domestic water, fire water, and communications. These utilities are supplied to airplane work areas, referred to as hardstands. Existing surface mounted utilities currently used to feed hardstands would be moved underground as part of the project. Connections would be made at each hardstand by stubbing lines to the surface. There would be no increase in the capacity of the utility systems or an increase in the number of hardstands currently located on the shoreline.

4.3 Area 3 – Central Apron Improvements

The Area 3 project location is defined as the frontage between Building 4-20 and Buildings 4-81 and 4-82 (**Figure 1**). It includes approximately 2.7 acres of pavement that would be replaced. Area 3 also includes general stormwater system improvements (see **Figure 8**).

4.4 Pavement Replacement

The proposed project would repave the entire apron to address pavement deterioration and eliminate transitions and differential settlements (**Figure 7**). The repaving operation would include demolition of all existing pavement, approximately 541,665 square feet and hard points and repaving with a dowelled cement concrete pavement of uniform thickness. After accounting for the changes in Areas 1 and 3 associated with ramp removal, asphalt removal, and pavement replacement, the total area of replaced pavement is approximately 540,506 square feet. Pavement replacement would be

designed to provide positive stormwater drainage and direct all runoff away from the lake. Treatment facilities would be provided, where feasible, given the relative depth of groundwater and stormwater structure dimensions.

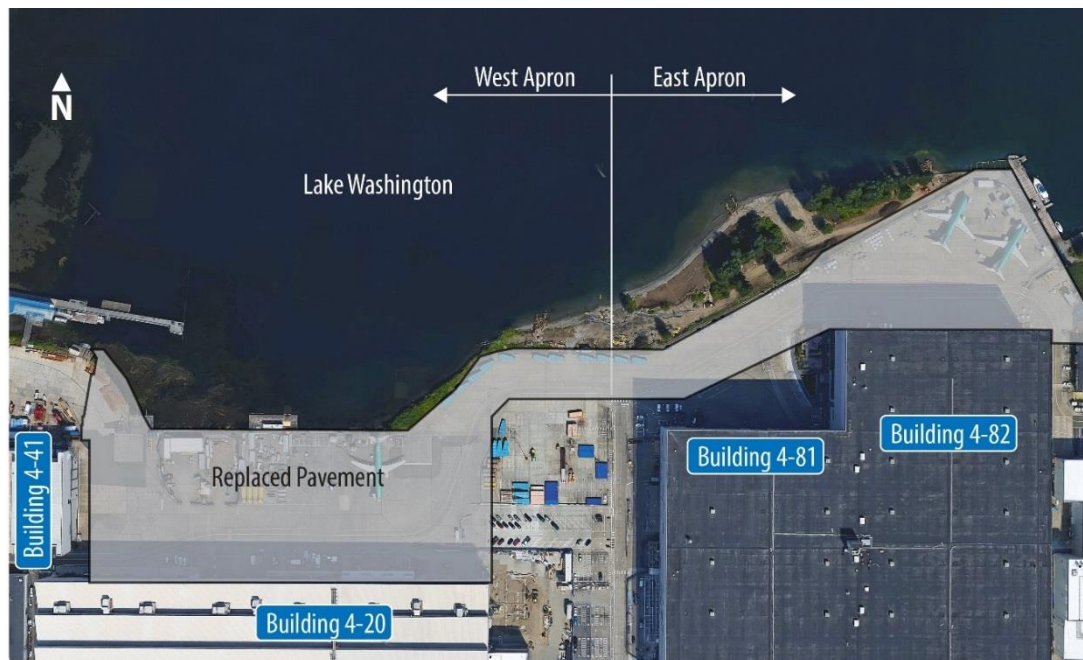


Figure 7. Apron R Pavement Replacement

4.5 DNR Utility Easements

As part of the Apron R project, Boeing has agreed to work with DNR to modify their existing utility easements on DNR lands adjacent to the Boeing property. These improvements occur within the 200-foot shoreline management zone of Lake Washington. Boeing currently has an easement (51-074812) for utilities (electrical, mechanical, water) that are located on the northern edge of pavement. The easement extends 15 feet onto DNR property. The Apron R project will relocate these utilities lines onto Boeing property and contain them within buried conduit in the apron.

Existing utilities will be completely removed from DNR property. Temporary excavation will be performed to expose buried utility on DNR land. Excavation of utilities on DNR land will disturb vegetation and remove approximately 5 trees (please refer to the Apron R Arborist Report and Tree Cutting Plan). After the utilities are removed, the stockpiled material will be replaced and restored to its current condition. Disturbed areas will be replanted to match plant species that were proposed as part of the DNR South Lake Washington Shoreline Restoration Project for the planting zone adjacent to Boeing property. The density and size of plants will be increased to compensate for the proposed disturbance. Tree will also be replaced, but they will be

planted outside the wing-tip clearance zone, and closer to Lake Washington so they will not contribute foreign object debris to the apron.

4.6 Stormwater Improvements

The majority of Apron R was constructed in the early 1940s before stormwater regulations were set in place that protected natural resources by directing development activities. There are 10 existing outfalls that direct runoff into Lake Washington from Apron R. Apron R was originally constructed to sheet flow away from buildings and directly into Lake Washington. Because there is no stormwater system in place on most of the apron, the Apron R project will implement a stormwater collection and conveyance system that not only conveys drainage more efficiently, but also results in cleaner stormwater runoff by routing it through added water quality treatment systems.

Stormwater improvements proposed within the limits of the Apron R project will include updated collection and conveyance systems, oil control facilities, and enhanced water quality treatment facilities. Where appropriate, isolation valves will be installed to facilitate emergency spill control and containment. Accessible sampling locations for ongoing stormwater monitoring will be installed. Pipe sizes will be increased to better contain large storm events and reduce discharge velocity at the outfalls. Finally, several existing outfalls will be relocated and/or extended to discharge at locations beyond shallow water habitat (2-meter depth) to minimize the impacts on juvenile salmonid habitat.



Figure 6. Apron R Stormwater Improvements

A source of habitat loss can occur from bottom scouring caused by high-velocity discharge at outfalls. Larger-diameter pipes would allow for reduced velocities of

stormwater and longer pipes would discharge waterward and below the shallow water habitat. Additionally, oil/water separators and water quality treatment vaults will be implemented to improve the water quality of stormwater discharged into Lake Washington.

4.6.1 Outfall Extension/Size

Surface water from the Apron R project site will contribute surface water runoff to five separate outfalls (see Table 2). The five existing outfalls are made up of a variety of pipe sizes (diameter, length) and pipe types (cast iron, high-density polyethylene, and vitreous clay). The project proposes to increase the pipe sizes and extend the pipes beyond the lower limit of the shallow water habitat and habitat enhancement area.

For Outfalls 014 and 012, the pipe size will be increased and the pipes will extend beyond the lower limit of the shallow water habitat and habitat enhancement area. Outfall 004A will be similarly extended, but the pipe size will remain the same. Outfalls 003 and 004 were upsized and extended beyond the shallow water habitat as part of the mitigation project for the DNR. The Apron R project incorporates the same logic for the affected outfalls.

Outfall 002 and other City of Renton drainage systems empty into a flume in the northeast portion of the project area. The combined discharges have directed an orange plume of iron-laden water toward the DNR mitigation site in the past. The proposed project would plug the existing Boeing outfall in the flume and construct a new outfall to the north. Discharge velocity at Outfall 002 will be reduced as a result of its relocation and increased pipe size. Additionally, the pipe will be extended away from the mitigation area. These modifications would minimize potential habitat loss from bottom scouring at the discharge site. The outfall relocation would separate Boeing’s discharge from other sources and make it easier for Boeing to monitor their discharge to the lake. A summary of proposed outfall improvements is presented in Table 1.

Table 1. Apron R Outfall Summary

Outfall Number	Existing Pipe Size/Type	Existing Tributary Flow (100-yr using SCS)	Project Proposal	New Pipe Size/Type	New Tributary Flow (100-yr using SCS)	Length Increase
<i>Area 1</i>						
011	8" DI	1.17 cfs	Removed			
012	10" VC	2.04 cfs	Increase Pipe Size and Extend Beyond Lower Limit of Shallow Water Habitat	12" HDPE	2.44 cfs	37

Outfall Number	Existing Pipe Size/Type	Existing Tributary Flow (100-yr using SCS)	Project Proposal	New Pipe Size/Type	New Tributary Flow (100-yr using SCS)	Length Increase
014	10" CI	3.9 cfs	Increase Pipe Size and Extend Beyond Lower Limit of Shallow Water Habitat	12" HDPE	2.44 cfs	60
016	8" DI	1.92 cfs	Removed			
021	60" RCP	NA	No In-water Improvements	NA		
Area 2						
002	27" Unknown	16.5 cfs	Relocate, increase Pipe Size and Extend Beyond Lower Limit of Shallow Water Habitat	36" HDPE	16.41 cfs	NA
Area 3						
003	18" HDPE	NA	No In-water Improvements	NA		
004	42" HDPE	NA	No In-water Improvements	NA		
004A	36" CI	6.33 cfs	Increase Pipe Size and Extend Beyond Lower Limit of Shallow Water Habitat	36" HDPE	13.53 cfs	27
010	8" DI	0.9 cfs	Removed			

Pipe Codes: CI - Cast iron, DI - Ductile Iron, HDPE - High Density Polyethylene, RCP - Reinforced Concrete Pipe, VC - Vitreous Clay

Area 1 includes Outfalls 011, 012, 014, and 016. The project proposes to eliminate Outfalls 011 and 016. Outfalls 012 and 014 will be upsized and extended beyond the shallow water habitat. The single outfall within Area 2 (Outfall 002) will be removed from its current position and relocated to the north (**Figure 7**). Area 3 consists of Outfalls 003, 004, 004A, and 010. The project proposes to remove Outfall 010, while Outfall 004A will be extended beyond the shallow water habitat. Outfalls 003 and 004 will remain unchanged, as both were previously improved by DNR mitigation and currently discharge beyond the shallow water habitat. Overall, improvements made to the three project areas will result in fewer, more efficient outfalls that preserve the integrity of the project's aquatic habitat enhancement program and Boeing's shoreline.

4.6.2 Water Quality Improvement

Currently, there are no water quality treatment systems in place on the apron. Stormwater runoff drains directly to Lake Washington without benefit of treatment or processes that remove harmful pollutants. The installation of oil/water separators and water quality treatment vaults within the project limits will greatly improve the quality of stormwater being discharged from the facility.

Enhanced water quality treatment and oil removal will be accomplished using a treatment train consisting of a coalescing plate type oil/water separator followed by a Linear Modular Wetland. Oil/water separators will provide for hydrocarbon removal, as required by Ecology and the City of Renton Surface Water Design Manual. The Linear Modular Wetland has been granted General Use Level approval by Ecology for enhanced level treatment, which includes the removal of dissolved copper and zinc. Unofficial oil removal redundancy will also be provided by the Linear Modular Wetland. A total of 12.4 acres of untreated paved area will be improved by enhanced water quality treatment and oil removal.

Apron R is a designated pathway for airplane transportation and storage during the manufacturing process. Given the industrial nature of the facility and the current lack of a stormwater system, the project invites the opportunity to retrofit the facility with a stormwater collection and conveyance system along with water quality treatment capabilities. The project proposes long-term clean water solutions that directly support Boeing's historical commitment to environmental stewardship and pollution prevention.